

Study Guide

For use with pages 237–241

GOAL**Multiply fractions and mixed numbers.****EXAMPLE 1****Multiplying Fractions**

$$-\frac{8}{15} \cdot \left(-\frac{3}{8}\right) = \frac{-8}{15} \cdot \left(\frac{-3}{8}\right)$$

Assign negative signs to numerators.

$$= \frac{-8 \cdot (-3)}{15 \cdot 8}$$

Use rule for multiplying fractions.

$$= \frac{\cancel{8}^1 \cdot (\cancel{-3}^{-1})}{1\cancel{5}_5 \cdot \cancel{8}_1}$$

Divide out common factors.

$$= \frac{1}{5}$$

Multiply.

Exercises for Example 1

Find the product.

1. $\frac{2}{3} \cdot \frac{3}{4}$

2. $\frac{15}{16} \cdot \frac{20}{21}$

3. $\frac{13}{16} \cdot \left(-\frac{5}{26}\right)$

4. $-\frac{14}{25} \cdot \left(-\frac{15}{28}\right)$

EXAMPLE 2**Multiplying a Mixed Number and an Integer**

Every day for a week you run $3\frac{3}{5}$ miles. What is the total distance you run for the week?

Solution

Total distance	=	Daily distance	•	Number of days
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$$= 3\frac{3}{5} \cdot 7$$

Substitute values.

$$= \frac{18}{5} \cdot \frac{7}{1}$$

Write numbers as improper fractions.

$$= \frac{18 \cdot 7}{5 \cdot 1}$$

Use rule for multiplying fractions.

$$= \frac{126}{5}$$

Multiply.

$$= 25\frac{1}{5}$$

Write fraction as a mixed number.

Answer: You run a total of $25\frac{1}{5}$ miles during the week.

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EXAMPLE 3 Multiplying Mixed Numbers

$$\begin{aligned}
 12\frac{3}{5} \cdot 3\frac{1}{3} &= \frac{63}{5} \cdot \frac{10}{3} \\
 &= \frac{\overset{21}{\cancel{63}} \cdot \overset{2}{\cancel{10}}}{\underset{1}{\cancel{5}} \cdot \underset{1}{\cancel{3}}} \\
 &= 42
 \end{aligned}$$

Write mixed numbers as improper fractions.

Use rule for multiplying fractions.
Divide out common factors.

Multiply.

Exercises for Examples 2 and 3

Find the product.

5. $6\frac{5}{12} \cdot 3$

6. $-1\frac{3}{10} \cdot 3$

7. $-3\frac{7}{25} \cdot (-15)$

8. $-2\frac{14}{27} \cdot (-18)$

9. $2\frac{11}{12} \cdot 3\frac{4}{7}$

10. $-3\frac{7}{15} \cdot \left(-1\frac{5}{16}\right)$

11. $-13\frac{5}{7} \cdot \left(-1\frac{13}{36}\right)$

12. $2\frac{4}{25} \cdot \left(-1\frac{19}{36}\right)$

EXAMPLE 4 Simplifying an ExpressionSimplify the expression $\frac{25x^5}{42} \cdot \frac{14x^3}{15}$.**Solution**

$$\begin{aligned}
 \frac{25x^5}{42} \cdot \frac{14x^3}{15} &= \frac{\overset{5}{\cancel{25}}x^5 \cdot \overset{1}{\cancel{14}}x^3}{\underset{3}{\cancel{42}} \cdot \underset{3}{\cancel{15}}} \\
 &= \frac{5x^{5+3}}{9} \\
 &= \frac{5x^8}{9}
 \end{aligned}$$

Use rule for multiplying fractions.
Divide out common factors.

Product of powers rule

Add exponents.

Exercises for Example 4

Simplify the expression.

13. $\frac{9a^2}{16} \cdot \frac{4a^8}{15}$

14. $-\frac{12x}{25} \cdot \frac{5x}{32}$

15. $-\frac{26y^8}{33} \cdot -\frac{11y^5}{12}$

16. $\frac{20z^4}{77} \cdot \frac{11z^{11}}{30}$